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ABSTRACT

Data from the National Longitudinal Study of the High School Class of 1972 were used in a study to investigate the relative effectiveness of high school grades and standardized aptitude test scores, together with demographic characteristics, in predicting early postsecondary educational activity of high school seniors. Self concept and locus of control were also included to determine whether improved prediction would result. Demographic characteristics included sex, race, and socioeconomic status. Students' postsecondary activity was classified as: (1) those enrolled in college; (2) those never enrolled in postsecondary education; (3) those enrolled in postsecondary education but not in college; and (4) those not participating in any educational activity. Membership in one of the groups was used as the criterion in several multiple discriminant analyses, performed with different subsets of the cognitive, noncognitive, and demographic variables. Results indicated that aptitude was the best single predictor of early postsecondary activity. When an individual's aptitude was unknown, grade point average was the next best single predictor. Aptitude and grade point average together were the best combination of predictors. Race, without aptitude results, was not a predictor, and neither self concept nor locus of control were effective predictors. (MH)

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A STUDY OF COGNITIVE AND NONCOGNITIVE CHARACTERISTICS AS PREDICTORS OF HIGH SCHOOL SENIORS' EARLY POSTSECONDARY EDUCATIONAL ACTIVITIES

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A Study of Cognitive and Noncognitive Characteristics
As Predictors of High School Seniors' Early Postsecondary
Educational Activities

Introduction and Background

In 1968, the National Center for Education Statistics (NCES), now under the Assistant Secretary for Education (ASE), DHEW, conducted a survey of educational policymakers and researchers to determine the need for information on individuals as they move out of the American high school system into the critical years of early adulthood. The survey found a need for student data that would permit comparisons of student educational experiences with later outcomes. In 1969, NCES started planning for a national longitudinal survey of high school graduates, as the first in a series of longitudinal studies of educational effects. A representative sample of students was to be selected, traced through postsecondary education and training, and then followed for some time after entrance into the job market.

In April 1970, leading educational researchers and administrators, as well as Federal officials who had participated in the conduct of longitudinal studies, assembled in Washington, D.C. to give advice on plans for a national survey to be conducted by NCES. Soon thereafter, the National Center for Education Statistics initiated the National Longitudinal Study of the High School Class of 1972 (NLS).

Following a rather extensive period of planning, which included the design and field test of survey instrumentation and procedures, the full-scale survey was initiated in the Spring of 1972. A national probability sample

of approximately 22,000 seniors from over 1,200 public, private, and church-affiliated high schools participated in the base-year survey.

The first follow-up data collection effort began in October, 1973, and was completed in April, 1974. Ninety-four percent of the 22,000 young adults completed the first follow-up instrument. Participants were asked where they were in the fall of 1973 and what they were doing in regard to work, education, and/or training. Similar information was requested for the same prescribed time period for the fall of 1972, to facilitate tracing of their progress since leaving high school and to define the factors that affected that progress.

Since 1973, follow-up surveys have been conducted on 1972 high school graduates every two years. Beginning in 1980, plans call for follow-up surveys to be done every three years.

The primary purposes of the NLS is to discover what happens to young adults after they leave high school or graduate (as measured by their subsequent educational and vocational activities, plans, aspirations, and selected attitudes) and to relate this information to their prior educational experiences and personal and biographical characteristics. Ultimately, the study will allow a better understanding of the development of students as they pass through the American educational system and of the complex factors associated with individual educational and career outcomes.

The unique orientation of the longitudinal approach as a research strategy with focus on the lives and developmental patterns of individuals over a period of time is particularly suitable for determining the effects of educational programs, policies, and practices. By concentrating on individuals rather than institutions, a data base is being established to help explain the impact of forces at work within postsecondary education and vocational training upon different kinds of students. The focus is on factors associated with individual educational attainments and career outcomes as revealed by the succession of significant educational and work attainments over time of a large national sample of young adults. Clearly, the need to know to what extent secondary and, more so, postsecondary education and training meet the needs of certain subpopulations characterized by such factors as ethnicity, socioeconomic status, ability, and attitudes were paramount considerations in the design of the NLS. Vital data on individuals who do not go to college or have obtained occupational training from proprietary schools will provide information on what difference this makes in their vocational outcomes.

The NLS is focused toward filling a widespread need on the part of the educational community; e.g., researchers and administrators at the secondary and postsecondary levels, for information on the "flow" of young adults from the secondary through the postsecondary occupational/educational system. Also, it is pointed toward identifying the major branching or decision points that affect educational and life patterns in the period immediately following secondary school. It assumes that significant linkages or path choices can be traced, estimates of the associated transition probabilities provided, (e.g., from high school to postsecondary education, work, or military, etc.)

and insight afforded into the relative importance of the factors and relationships which determine these transition probabilities. It is thought that such insight will increase understanding of the prior or intervening educational and work experiences which influence these transition probabilities and which may be associated in different ways with the various subpopulations that can be defined from the background variables.

The amount of substantive data collected in the NLS is massive, indeed, with an analysis capability of unlimited dimension. One important element of the NLS data which has given rise to this study is the knowledge of the characteristics of the students who apply to college or other postsecondary institutions (and those who do not apply) including not only their race, sex, family background, etc., but certain of their attitudes as well. (Educators have for years been primarily concerned with students cognitive characteristics (i.e., aptitude and/or ability) as determinants of postsecondary enrollment and educational success.) Noncognitive characteristics (i.e., self-concept and locus of control) have for the most part been neglected.

Objectives

The best indicator of whether or not a high school senior goes on to higher education or some other postsecondary educational activity has generally been considered to be the individual's ability as measured by high school grades and/or scores on standardized aptitude tests. Other indicators of postsecondary educational activity have included sex, race, and socio-economic status. This study investigated the relative effectiveness of high school grades and standardized aptitude tests in predicting early postsecondary

educational activity when each was considered in conjunction with demographic characteristics. It also attempted to determine if self-concept and/or locus of control when included with demographic and cognitive characteristics would improve the prediction of the early postsecondary educational activities of high school seniors.

Theoretical Framework

Since the diversity in background characteristics and academic preparation of students interested in postsecondary education is increasing, it would seem that their differential ability to profit from further training and education would also increase. Thus it becomes critical to evaluate the total individual, rather than just the cognitive strengths of the individual, particularly where good psychological adjustment would have a positive effect on cognitive achievement and thus foster educational mobility. The student's perception of himself, his attitudes, his likes and dislikes are all characteristics that educators and others should consider in the total process of evaluating an individual's potential and educational future. Consequently, examining noncognitive characteristics as well as cognitive characteristics will give more attention to the role noncognitive factors have in postsecondary education.

Methodology

Data from the National Longitudinal Study of the High School Class of 1972 (NLS) were used in this study. NLS sampled approximately 22,000 high school students during their senior year and administered standardized aptitude tests in reading, mathematics, and symbolic reasoning. NLS also obtained

data on the students' high school performance (grade-point average) and demographic characteristics. These students were followed up one and a half years after high school graduation and at that time data on post-secondary activities were obtained. These postsecondary activities and seven cognitive and noncognitive variables represented the dependent and independent variables respectively. The activity state variable was taken from the First-Follow Up Survey of the National Longitudinal Study of the High School Class of 1972 (NLS) and represents mutually exclusive groups of individuals, those enrolled in college in October, 1973, those never enrolled in postsecondary education at anytime after high school graduation, those enrolled in postsecondary education but not college in October, 1973, and those not participating in any educational activity. Cognitive and noncognitive variables, the independent variables, were all taken from the Base-Year Survey of the National Longitudinal Study. There are two noncognitive psychological measures labeled locus of control and self-concept; three noncognitive demographic measures, sex, race, and socio-economic status; and finally, two cognitive measures, grade-point average and standardized test scores. Each of the 15,000 respondents for whom complete data were available were classified into one of these four post-secondary activities. Membership in these four groups was used as the criterion in several multiple discriminant analyses. Each of the discriminant analyses was performed with different subsets of cognitive (standardized aptitude tests and high school grade-point average), noncognitive (self-concept and locus of control) and demographic (sex, race, and socio-economic status) characteristics as in-

dependent variables. For each set of independent variables, the proportion of individuals correctly classified by the significant discriminant functions into each of the four postsecondary activities was determined. Chi-square analysis was then used to examine differences in the proportion of individuals correctly classified by the different sets of independent variables.

Results and Conclusions

It was found that an individual's early postsecondary educational activity can be predicted from using all demographic and cognitive variables, if the individual either enrolls in a college or university or never enrolls in any type of postsecondary education after graduation from high school (table 1). However, the postsecondary activity of those who enroll in postsecondary education other than college, and those who enrolled in college but left it to enroll in some other type of postsecondary education could not be predicted from the demographic and cognitive variables used in this study (table 1). It was also found that noncognitive traits, specifically self-concept and locus of control, contribute minimally to the prediction of an individual's early postsecondary educational activity when supplemented by an individual's sex, race, socioeconomic status, grade-point average, and scores on standardized aptitude tests (table 4). In other words, knowing self-concept and locus of control in addition to having demographic and cognitive information does not increase one's ability to predict correctly that individual's early postsecondary educational activity.

In addition to these general findings, the analysis also revealed a number of important highlights which should contribute to understanding the characteristics of who goes on to college or a university and who does not participate in any postsecondary educational activity. Specifically, aptitude and grade-point average were the two most important predictors of an individual's early postsecondary educational activity (table 1). In all cases where aptitude was included in the prediction model, it contributed the most, among the predictors used in this study, to the classification of an individual into his early postsecondary educational activity (tables 1, 2, 4, 5, 6). When aptitude was omitted from the set of independent variables, and grade-point average was included, grade-point average contributed most to the prediction of an individual's early postsecondary educational activity (tables 3, 7, 8). In addition, when sex, race, socio-economic status, and aptitude were analyzed collectively in predicting early postsecondary activity, aptitude and race were concomitant variables in predicting an individual's early postsecondary educational activity (tables 1, 2, 4, 5, 6). When aptitude was not included in the prediction model, race made essentially no contribution to the prediction of an individual's early postsecondary activity (tables 7,8). It may be concluded, then, from these results that aptitude remains the best single predictor of early postsecondary activity. In addition, an individual's GPA in high school is the next best single predictor of that individual's early postsecondary activity when an individual's aptitude is not known. Together, aptitude and grade-point average contribute the most to predicting an individual's activity after high graduation. Finally race is not a predictor of an individual's early postsecondary educational activity unless the aptitude of that individual is also included with race

in the prediction model.

Educational Importance of the Study

The results of this study indicated that neither of the noncognitive variables used in this study, i.e., self-concept and locus of control, contributed to the prediction of early postsecondary educational activities. However, this study was an initial exploration into understanding the different effects that noncognitive factors have on the postsecondary educational activities of students with differing characteristics. Since empirical knowledge of the relationship between cognitive, demographic, and noncogitive characteristics and students' postsecondary educational activities could assist in guiding students through the educational process, information to this end must continue to be collected and analyzed. Further research into this area might eventually facilitate efforts to make more viable decisions on seniors' plans following high school and could be useful as a base from which other educational activities might derive direction.

Table 1. Analysis I: Aptitude, Grade-point average, Race, Sex, and Socioeconomic Status Variables predicting post-secondary activity state

ORDERED STANDARDIZED WEIGHTS OF EACH INDEPENDENT VARIABLE

Variable Name	Standardized Discriminant Function Coefficients
Aptitude	+ 0.83119
Grade-point average	+ 0.35693
Race (White)	- 0.23685
Sex	- 0.13523
Socioeconomic status	+ 0.07448
Race (Black)	+ 0.06873
Group Scores on the Discriminant Function	
Activity state 1	+ 0.58269
Activity state 2	- 0.52282
Activity state 3	- 0.05448

PERCENT OF SUBJECTS CORRECTLY CLASSIFIED BY THE ABOVE DISCRIMINANT FUNCTION

Activity State	Total Number of Cases	Predicted Activity State		
		Group 1	Group 2	Group 3
Activity state 1 Enrolled in college	4,957	3,241 (65.40)	861 (17.40)	855 (17.20)
Activity state 2 Never enrolled in PSE at any time	5,352	1,062 (19.80)	3,229 (60.30)	1,061 (19.80)
Activity state 3 Enrolled in PSE but not college	2,452	900 (36.70)	977 (39.80)	575 (23.50)

Percent of "Grouped" Cases Correctly Classified: 55.21%

NOTE: Number in parentheses represents percent of cases for each predicted activity state membership.

Table 2. Analysis II: Aptitude, Race. Socioeconomic Status, and Sex Variables predicting postsecondary activity state

ORDERED STANDARDIZED WEIGHTS OF EACH INDEPENDENT VARIABLE

Variable Name	Standardized Discriminant Function Coefficients
Aptitude	+ 1.09799
Race (White)	- 0.30522
Socioeconomic status	+ 0.07318
Sex	- 0.06884
Race (Black)	+ 0.05564
Group Scores on the Discriminant Function	
Activity state 1	+ 0.56194
Activity state 2	- 0.50037
Activity state 3	- 0.04383

PERCENT OF SUBJECTS CORRECTLY CLASSIFIED BY THE ABOVE DISCRIMINANT FUNCTION

Activity State	Total Number of Cases	Predicted Activity State		
		Group 1	Group 2	Group 3
Activity state 1 Enrolled in college	4,957	3,276 (66.10)	895 (18.10)	786 (15.90)
Activity state 2 Never enrolled in PSE at any time	5,352	1,210 (22.60)	3,193 (59.70)	949 (17.70)
Activity state 3 Enrolled in PSE but not college	2,452	958 (39.10)	970 (39.60)	524 (21.40)

Percent of "Grouped" Cases Correctly Classified: 54.80%

NOTE: Number in parentheses represents percent of cases for each predicted activity state membership.

Table 3: Analysis III: Grade-point average, Sex, and Socioeconomic Status, Variables predicting postsecondary activity state.

ORDERED STANDARDIZED WEIGHTS OF EACH INDEPENDENT VARIABLE

Variable Name	Standardized Discriminant Function Coefficients
Grade-point average	+ 1.01579
Sex	- 0.26394
Socioeconomic state	+ 0.26394
Group Scores on the Discriminant Function	
Activity state 1	+ 0.46190
Activity state 2	- 0.40145
Activity state 3	- 0.07151

PERCENT OF SUBJECTS CORRECTLY CLASSIFIED BY THE ABOVE DISCRIMINANT FUNCTION

Activity State	Total Number of Cases	Predicted Activity State		
		Group 1	Group 2	Group 3
Activity state 1 Enrolled in college	4,957	2,963 (59.80)	1,897 (38.30)	97 (2.00)
Activity state 2 Never enrolled in PSE at any time	5,352	1,372 (25.60)	3,836 (71.70)	144 (2.70)
Activity state 3 Enrolled in PSE but not college	2,452	918 (37.40)	1,463 (59.70)	71 (2.90)

Percent of "Grouped" Cases Correctly Classified: 53.84%

NOTE: Number in parentheses represents percent of cases for each predicted activity state membership.

Table 4: Analysis IV: Aptitude, Grade-point average, Sex, and Self-Concept, Locus of control, and Socioeconomic Status Variables predicting postsecondary activity state.

ORDERED STANDARDIZED WEIGHTS OF EACH INDEPENDENT VARIABLE

Variable Name	Standardized Discriminant Function Coefficients
Aptitude	+ 0.77791
Grade-point average	+ 0.33319
Race (White)	- 0.23934
Sex	- 0.13232
Self-concept	+ 0.10802
Locus of control	- 0.10154
Socioeconomic status	+ 0.07884
Race (Black)	+ 0.05132

Group Scores on the Discriminant Function

Activity state 1	+ 0.58638
Activity state 2	- 0.53046
Activity state 3	- 0.05131

PERCENT OF SUBJECTS CORRECTLY CLASSIFIED BY THE ABOVE DISCRIMINANT FUNCTION

Activity State	Total Number of Cases	Predicted Activity State		
		Group 1	Group 2	Group 3
Activity state 1 Enrolled in college	4,957	3,258 (65.70)	841 (17.00)	858 (17.30)
Activity state 2 Never enrolled in PSE at any time	5,352	1,043 (19.50)	3,223 (60.20)	1,086 (20.30)
Activity state 3 Enrolled in PSE but not college	2,452	958 (37.00)	970 (39.20)	524 (23.80)

Percent of "Grouped" Cases Correctly Classified: 55.36%

NOTE: Number in parentheses represents percent of cases for each predicted activity state membership.

Table 5. Analysis V: Aptitude, Grade-point average, Race, Sex, Locus of Control, and Socioeconomic States Variable predicting postsecondary educational activity

Variable Name	Standardized Discriminant Function Coefficients
Aptitude	+ 0.76978
Grade-point average	+ 0.34988
Race (White)	- 0.24162
Sex	- 0.14463
Locus of control	- 0.14463
Socioeconomic status	+ 0.07826
Race (White)	+ 0.05872
Group Scores on the Discriminant Function	
Activity state 1	+ 0.58331
Activity state 2	- 0.52719
Activity state 3	- 0.05216

PERCENT OF SUBJECTS CORRECTLY CLASSIFIED BY THE ABOVE DISCRIMINANT FUNCTION

Activity State	Total Number of Cases	Predicted Activity State		
		Group 1	Group 2	Group 3
Activity state 1 Enrolled in college	4,957	3,260 (65.80)	840 (16.90)	857 (17.30)
Activity state 2 Never enrolled in PSE at any time	5,352	1,041 (19.50)	3,231 (60.40)	1,080 (20.20)
Activity state 3 Enrolled in PSE but not college	2,452	900 (36.70)	951 (38.80)	601 (24.50)

Percent of "Grouped" Cases Correctly Classified: 55.58%

NOTE: Number in parentheses represents percent of cases for each predicted activity state membership.

Table 6. Analysis VI: Aptitude, Grade-point average, Race, Self-Concept, Sex, and Socioeconomic Status Variables predicting postsecondary educational activity

ORDERED STANDARDIZED WEIGHTS OF EACH INDEPENDENT VARIABLE

Variable Name	Standardized Discriminant Function Coefficients
Aptitude	+ 0.82626
Grade-point average	+ 0.33665
Race (White)	- 0.23805
Self-concept	+ 0.12474
Sex	- 0.12209
Socioeconomic status	+ 0.07902
Race (Black)	+ 0.05399

Group Scores on the Discriminant Function	
Activity state 1	+ 0.58494
Activity state 2	- 0.52800
Activity state 3	0 0.05285

PERCENT OF SUBJECTS CORRECTLY CLASSIFIED BY THE ABOVE DISCRIMINANT FUNCTION

Activity State	Total Number of Cases	Predicted Activity State		
		Group 1	Group 2	Group 3
Activity state 1 Enrolled in college	4,957	3,253 (65.60)	873 (17.60)	831 (16.80)
Activity state 2 Never enrolled in PSE at any time	5,352	1,040 (19.40)	3,836 (60.50)	144 (20.00)
Activity state 3 Enrolled in PSE but not college	2,452	903 (36.80)	969 (39.50)	580 (23.70)

Percent of "Grouped" Cases Correctly Classified: 55.42%

NOTE: Number in parentheses represents percent of cases for each predicted activity state membership.

Table 7. Analysis VII: Grade-point average, Sex, Race and Locus of Control Variables predicting postsecondary educational activity

ORDERED STANDARDIZED WEIGHTS OF EACH INDEPENDENT VARIABLE

Variable Name	Standardized Discriminant Function Coefficients
Grade-point average	+ 0.88736
Sex	- 0.41538
Race (White)	- 0.34603
Locus of control	- 0.28327
Group Scores on the Discriminant Function	
Activity state 1	+ 0.31816
Activity state 2	- 0.43996
Activity state 3	- 0.04833

PERCENT OF SUBJECTS CORRECTLY CLASSIFIED BY THE ABOVE DISCRIMINANT FUNCTION

Activity State	Total Number of Cases	Predicted Activity State		
		Group 1	Group 2	Group 3
Activity state 1 Enrolled in college	199	123 (61.80)	50 (25.10)	26 (13.10)
Activity state 2 Never enrolled in PSE at any time	134	44 (32.80)	71 (53.00)	19 (14.20)
Activity state 3 Enrolled in PSE but not college	82	36 (43.90)	31 (37.80)	15 (18.30)

Percent of "Grouped" Cases Correctly Classified: 50.36%

NOTE: Number in parentheses represents percent of cases for each predicted activity state membership.

Table 8. Analysis VIII: Grade-point average, Sex and Race Variables predicting postsecondary educational activity

ORDERED STANDARDIZED WEIGHTS OF EACH INDEPENDENT VARIABLE

Variable Name	Standardized Discriminant Function Coefficients
Grade-point average	+ 0.97769
Sex	- 0.40698
Race	- 0.36213
Group Scores on the Discriminant Function	
Activity state 1	+ 0.31000
Activity state 2	- 0.41959
Activity state 3	- 0.06573

PERCENT OF SUBJECTS CORRECTLY CLASSIFIED BY THE ABOVE DISCRIMINANT FUNCTION

Activity State	Total Number of Cases	Predicted Activity State		
		Group 1	Group 2	Group 3
Activity state 1 Enrolled in college	199	127 (63.80)	29 (14.60)	43 (21.60)
Activity state 2 Never enrolled in PSE at any time	134	47 (35.10)	53 (39.60)	34 (25.40)
Activity state 3 Enrolled in PSE but not college	82	38 (46.30)	21 (25.60)	23 (28.80)

Percent of "Grouped" Cases Correctly Classified: 48.92%

NOTE: Number in parentheses represents percent of cases for each predicted activity state membership.